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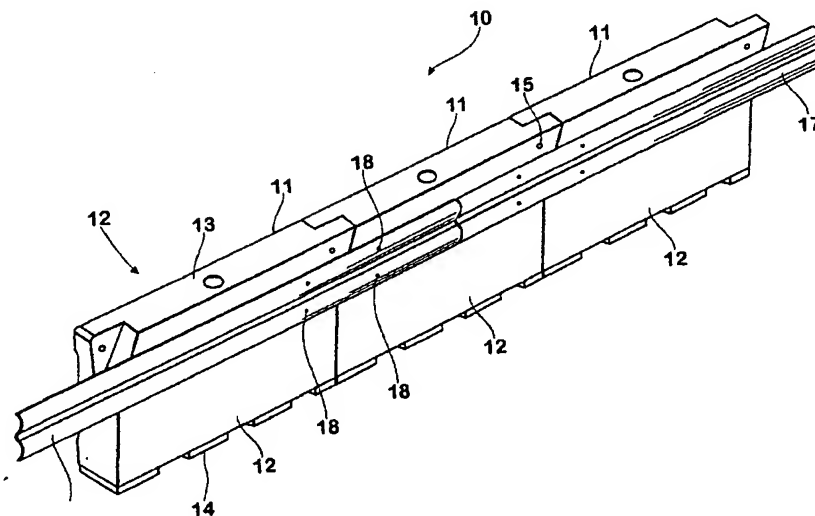
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- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A BARRIER



(57) Abstract: A barrier system (10) comprising a plurality of barrier elements (11) wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent barrier elements such that the side walls (12) of at least one side of the plurality of barrier elements form a longitudinally extending obstacle and having a longitudinally extending guard (17) mounted thereon and wherein the longitudinally extending guard overlies two or more of the barrier elements. In a further embodiment the plurality of barrier elements include a foundation (50) wherein said foundation is integral with the plurality of barrier elements or engaged with the plurality of barrier elements and which foundation is anchored to the surface on which the barrier system is to be deployed.

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A BARRIER

This invention relates to a barrier.

This invention has particular but not exclusive application to traffic barriers and for illustrative purposes reference will be made to such application.

5 Demountable traffic barriers typically include a plurality of hollow, water fillable, barrier elements which are arranged end to end and are linked by a plurality of pin joints or by interlocking end portions.

Often the connection means connecting adjacent barrier elements and/or the side walls of individual barrier elements are damaged by collisions with motor
10 vehicles. The resulting damage often severely weakens the structural integrity of the barrier.

Damaged barrier elements may remain undetected for several days. Furthermore, the replacement of damaged barrier elements may necessitate that repair crews travel considerable distances to the crash site and wherein they may
15 need to carry with them sufficient water to fill the replacement barrier elements.

Damaged barrier elements also pose a hazard to motorists and cyclists. Ruptured side walls may have sharp edges which could severely injure a person who is thrown against the barrier element, such as may occur if a cyclist were to fall from their bicycle. It has also been noted that punctures in the side walls of the barrier
20 elements may snare a part of a travelling motor vehicle that has collided with the barrier and as a consequence may create an accident rather than redirect the motor vehicle back onto the road.

The present invention aims to alleviate at least one of the above disadvantages and to provide a barrier which will be reliable and efficient in use.
25 Other advantages of this invention will hereinafter become apparent.

With the foregoing and other objects in view, this invention in one aspect resides broadly in a barrier system comprising a plurality of barrier elements wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent barrier elements such that the side walls of at least one side of the plurality
30 of barrier elements form a longitudinally extending obstacle having a longitudinally extending guard mounted thereon and wherein the longitudinally extending guard overlies two or more of the barrier elements.

Barrier elements suitable for use in the present invention include a wide variety of barrier elements which are capable of being maintained substantially in abutment with adjacent barrier elements. Such barrier elements for use as traffic barriers include demountable traffic barriers of the hollow, ballast-fillable type, stackable barrier elements and other barrier elements such as concrete barriers. In a preferred embodiment the hollow, ballast-fillable, stackable barrier elements are fillable with sand or water.

The barrier elements are maintained substantially in abutment with adjacent barrier elements. It will be understood that barrier elements which are substantially in abutment with adjacent barrier elements are positioned either in abutment with adjacent barrier elements or positioned end to end with adjacent barrier elements at a proximity which is intended to redirect the motor vehicle or the like back onto the desired path rather than to snare part of the motor vehicle or the like. The proximity of adjacent barrier elements will depend on the particular shape and configuration of the barrier elements and readily determined by those skilled in the art so as to avoid snaring of a travelling motor vehicle or the like.

Adjacent barrier elements may be maintained substantially in abutment with a variety of jointing systems including the use of interlocking end portions, jointing pins, and other jointing systems which will be readily apparent to those skilled in the art.

The plurality of barrier elements maintained substantially in abutment with adjacent barrier elements have side walls of at least one side of the plurality of barrier elements which form a longitudinally extending obstacle. In a preferred embodiment, the barrier elements maintained substantially in abutment with adjacent barrier elements have both side walls of the plurality of barrier elements forming longitudinally extending obstacles on either side of the barrier system.

The profile of at least one side wall of the barrier element, in some embodiments, may be arranged to compliment or receive the guard which may, when assembled bear against same.

The longitudinally extending guard may be substantially flat or arcuate in cross-section, and may include one more longitudinally extending ribs. In a preferred embodiment, the longitudinally extending guard may have a curved cross section having one or more convex segments extending from the barrier elements.

The guard may be manufactured from a variety of materials such as plastics materials and metallic materials or composite materials. In one embodiment the guard may be formed from thin walled metal section, such as roll formed galvanised steel.

- 5 The guard may be in the form of a continuous member such as a polymeric member wound on a spool for engagement with a plurality of barrier elements in situ. Alternatively, the guard may be formed from a plurality of guard segments such as the thin walled sections described above.

10 The longitudinally extending guard overlies two or more of the barrier elements. Advantageously, providing a guard which overlies a plurality of adjacent barrier elements serves to increase the stability of the barrier system and render it less deformable when subjected to minor impact. It is preferred that the guard overlie and be mounted on a multiplicity of adjacent barrier elements. Where the guard is formed from a plurality of guard segments, it is preferred that each guard
15 segment overlie two or more of the barrier elements. It is preferred that where the longitudinally extending guard is formed from a plurality of guard segments, each guard segment is a multiple of the length of each barrier element such that whereby a plurality of guard segments are connected, they each overlie a plurality of barrier elements and terminate along the side wall of the barrier element rather than
20 adjacent to the end of the barrier element where it abuts and adjacent barrier element. It is preferred that each guard segment terminate at the mid portion of a barrier element. The guard may be secured to a barrier element by any convenient means. For example, by a plurality of threaded fasteners which extend through tubes connecting opposing side walls of the barrier element. In other embodiments,
25 the guard may be secured to the barrier element using one or more clamps or clips. The guard or guards may be adapted to cover all or only selected portions of the side wall of the barrier elements. For example, the guard may only cover the portion of the side wall of the barrier element that is most frequently struck by motor vehicles, such as the mid portion of the side wall.

- 30 It will be appreciated that in some embodiments guards may extend longitudinally along opposing side walls of the barrier elements such that the water filled barrier elements are sandwiched between opposing guards.

In one embodiment, the guards and/or the barrier elements may also be secured to the ground if so desired. The barrier elements may include or be engaged with a foundation anchored to the surface on which the barrier system is to be deployed. The foundation may be integral with the base wall of the barrier element or may be releasably engaged therewith. The foundation may engage the surface in a non slip or fixed manner. Suitable engagement may include providing the foundation with a plurality of pointed members such as spikes or barbs which penetrate the surface. Alternatively the foundation may include a pad or plurality of pads formed from a deformable plastics or rubber like material which will hinder the movement of the barrier element relative to the surface. The foundation may also be adhered to the surface by an adhesive or a combination of an adhesive and an interlocking key on the foundation, for example, the use of foundation which is maintained on the surface of a roadway with protrusion in the form a metal spike, a bitumen or concrete key adapted to engage with a key way on the foundation.

The present invention also provides a barrier system comprising a plurality of barrier elements wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent barrier elements such that the side walls of at least one side of the plurality of barrier elements form a longitudinally extending obstacle wherein the barrier elements include a foundation wherein said foundation is integral with the plurality of barrier elements or engaged with the plurality of barrier elements and which foundation is anchored to the surface on which the barrier system is to be deployed.

In order that this invention may be more easily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention, wherein:

Figure 1 is a pictorial view of a barrier constructed in accordance with the present invention.

Figure 2 is a pictorial view of a barrier system of the type shown in Figure 1 having a non slip mat for engagement with the surface on which the barrier system is to be deployed.

Figure 3 is a pictorial view of a barrier system of the type shown in Figure 1 having an adhesive mat for engagement with the surface on which the barrier system is to be deployed.

Figure 4 is a pictorial view of a barrier system of the type shown in Figure 1 having integrally moulded protrusions for engagement with the surface on which the barrier system is to be deployed.

Figure 5 is a pictorial view of a barrier system constructed in accordance with that shown in Figure 1 having a detachable foundation for engagement with the surface on which the barrier system is to be deployed.

Figure 1 shows a barrier 10 that includes a plurality of hollow, water pliable, barrier elements 11 that have been arranged end to end so as to form a substantially continuous, longitudinally extending obstacle. The barrier elements 11 each include a pair of opposing side walls 12 that are maintained in a spaced relationship by a top wall 13 and a base wall 14.

Preferably adjacent barrier elements 11 are connected by a plurality of threaded fasteners 15 that retain mating end portions 16 of the respective barrier elements 11 engaged.

The barrier 10 also includes a number of guards 17 manufactured from a thin walled, rolled section, of galvanised steel. The guards 17 are arranged end to end and are secured to the barrier elements by threaded fasteners 18. Individual guards are positioned such that they overlie the connection between adjacent barrier elements 11.

In use, the guards 17 protect the barrier elements 11 from direct contact with a motor vehicle and help strengthen the connection between adjacent barrier elements.

Figure 2 shows the barrier system of Figure 1 which further includes a non slip mat 20 positioned for engagement with the surface on which the barrier system is to be deployed.

Figure 3 shows the barrier system of Figure 1 which further includes an adhesive 30 positioned for engagement with the surface on which the barrier system is to be deployed.

Figure 4 shows the barrier system of Figure 1 further including integrally moulded spikes 40 projecting from the base wall 14 of the barrier elements.

Figure 5 shows a foundation 50 having downwardly projecting spikes 51. The foundation 50 engages with adjacent barrier elements 11 which are retained in engagement with the foundation 50 by pins (not shown) which pass through

apertures 53 into corresponding apertures 52 and optionally into the surface on which the barrier system is deployed.

It will of course be realised that the above has been given only by way of illustrative example of the present invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is herein described.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A barrier system comprising a plurality of barrier elements wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent
5 barrier elements such that the side walls of at least one side of the plurality of barrier elements form a longitudinally extending obstacle having a longitudinally extending guard mounted thereon and wherein the longitudinally extending guard overlies two or more of the barrier elements.
- 10 2. A barrier system according to claim 1 wherein the barrier elements are selected from the group consisting of hollow, ballast-fillable barrier elements, stackable barrier elements and concrete barrier elements.
3. A barrier system according to claim 2 wherein the hollow, ballast-fillable
15 elements are fillable with sand or water.
4. A barrier system according to claim 1 wherein the longitudinally extending guard is substantially flat or arcuate in cross-section.
- 20 5. A barrier system according to claim 1 wherein the longitudinally extending guard has a curved cross section having one or more convex segments extending from the barrier elements.
6. A barrier system according to claim 1 wherein the guard may be formed from
25 thin walled metal sections.
7. A barrier according to claim 1 wherein the longitudinally extending guard overlies two or more barrier elements and wherein said longitudinally extending guard is formed from a plurality of guard segments wherein each of said guard
30 segments terminates at a mid portion of a barrier element.
8. A barrier system according to claim 1 wherein the plurality of barrier elements include a foundation wherein said foundation is integral with the plurality of barrier

elements or engaged with the plurality of barrier elements and which foundation is anchored to the surface on which the barrier system is to be deployed.

9. A barrier system according to claim 8 wherein the foundation is anchored to the surface with a plurality of pointed members, a non slip pad, an adhesive, or an interlocking key.

10. A barrier system comprising a plurality of barrier elements wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent barrier elements such that the side walls of at least one side of the plurality of barrier elements form a longitudinally extending obstacle 1 wherein the plurality of barrier elements include a foundation wherein said foundation is integral with the plurality of barrier elements or engaged with the plurality of barrier elements and which foundation is anchored to the surface on which the barrier system is to be deployed.

15

11. A barrier system according to claim 10 wherein the foundation is anchored to the surface with a plurality of pointed members, a non slip pad, an adhesive, or an interlocking key.

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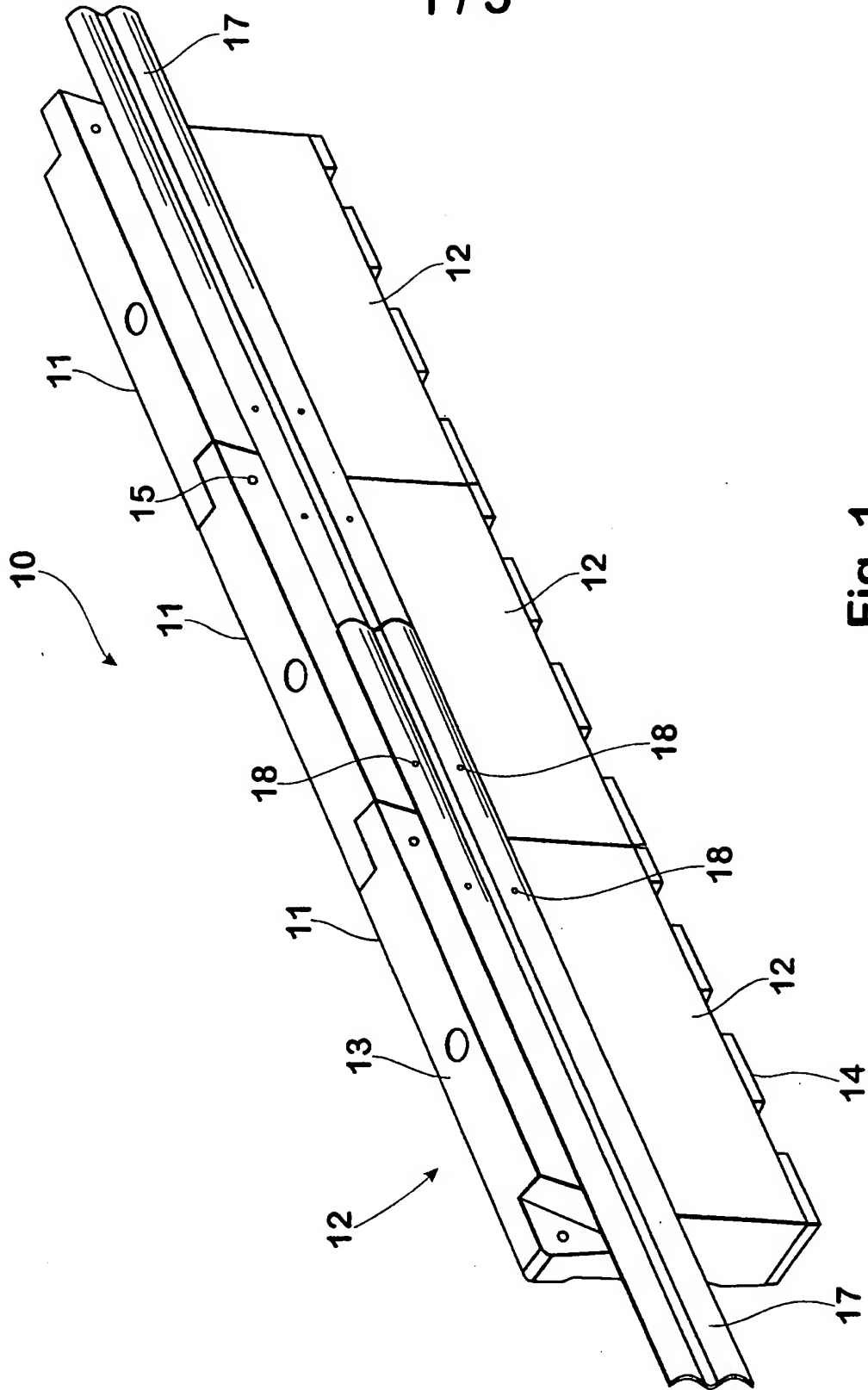


Fig. 1

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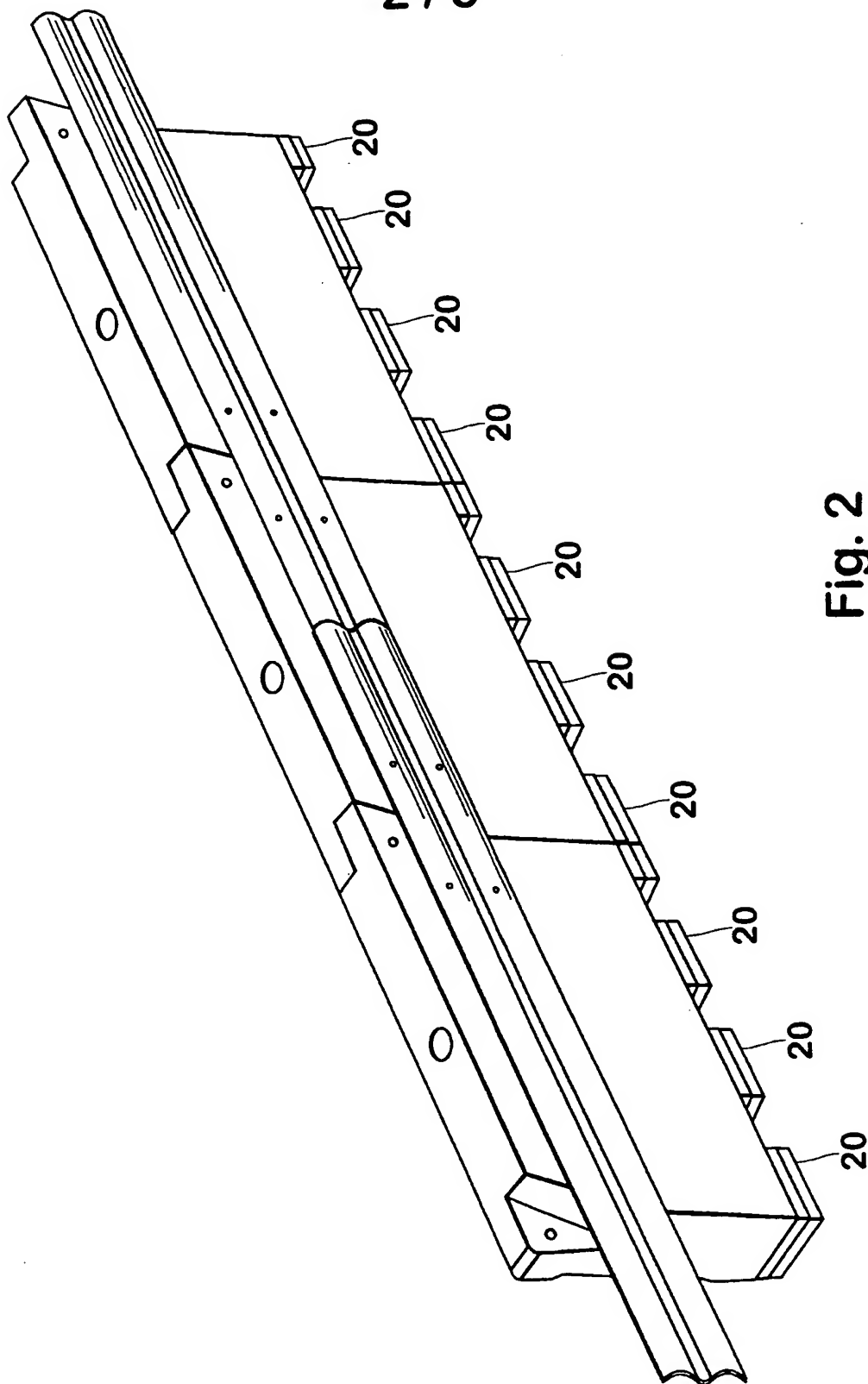


Fig. 2

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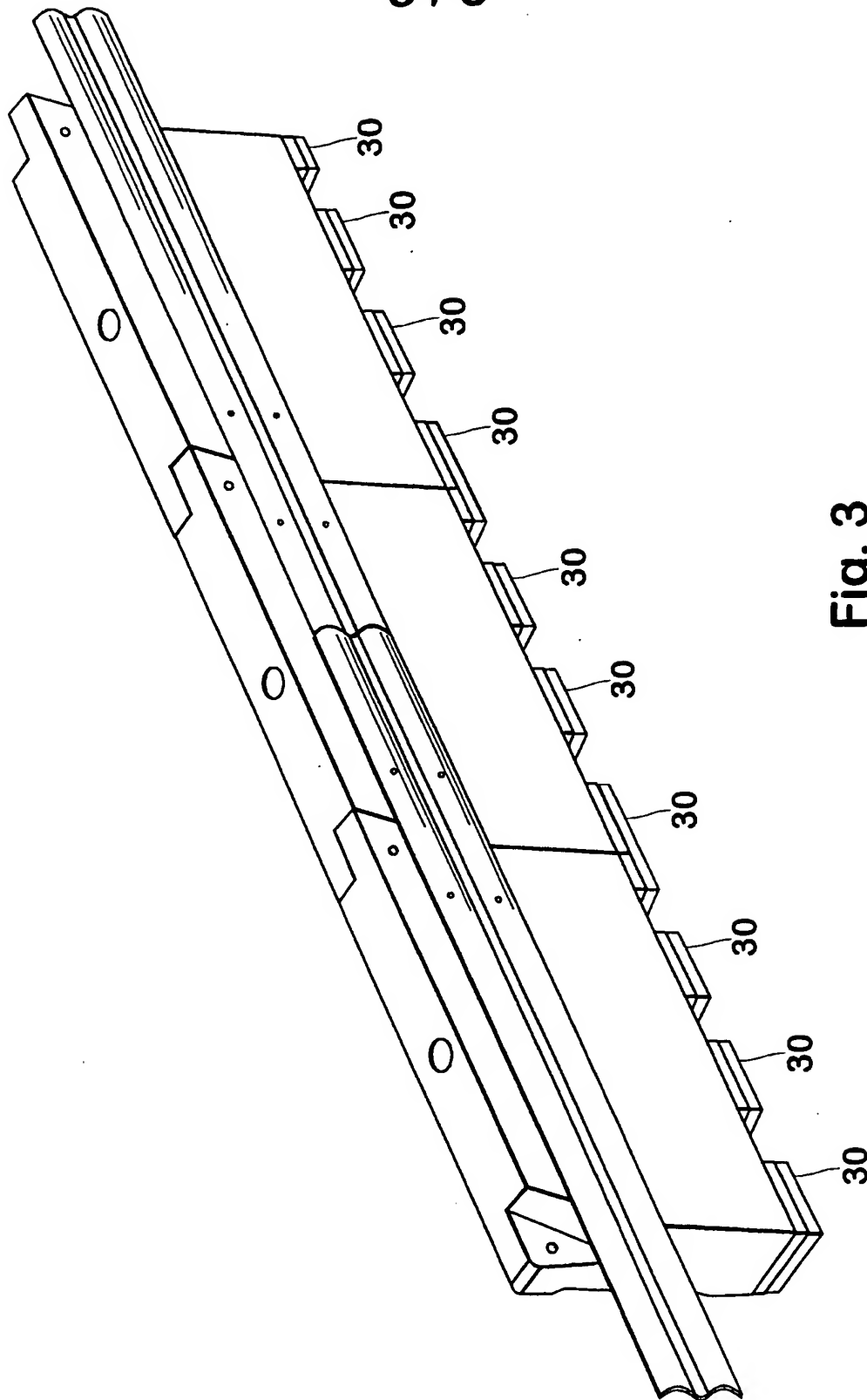


Fig. 3

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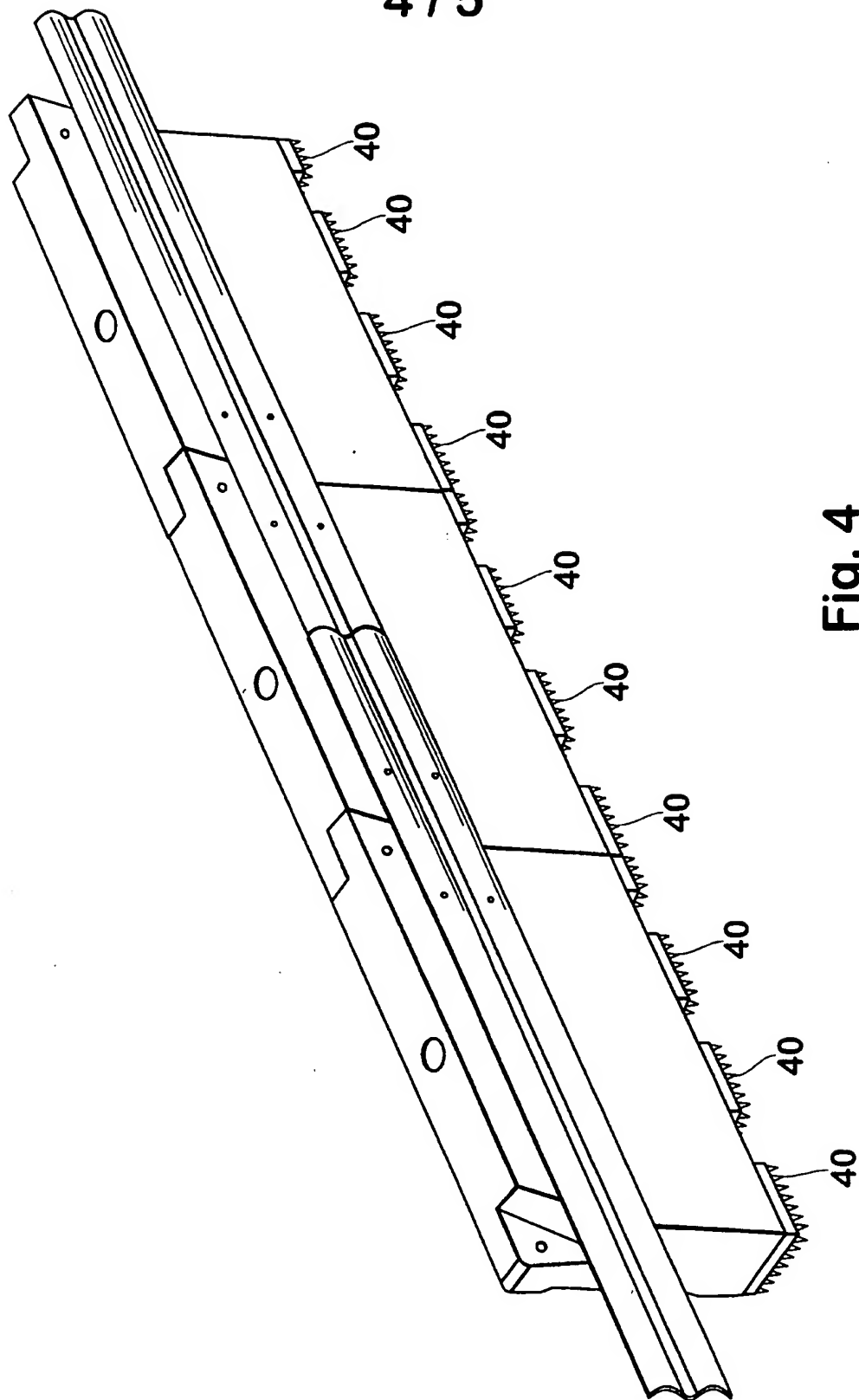


Fig. 4

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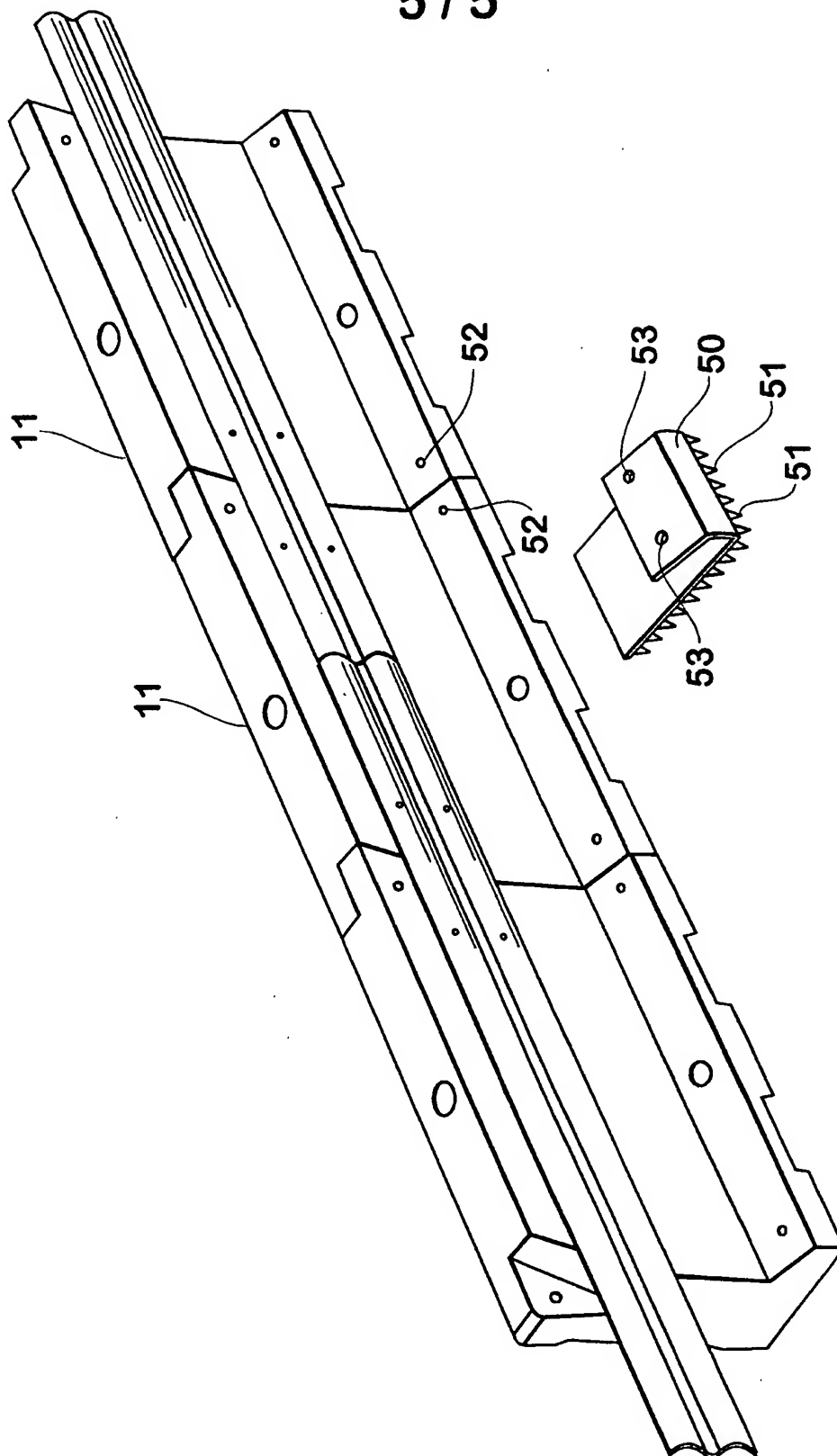


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU00/00950

A. CLASSIFICATION OF SUBJECT MATTER		
Int. Cl. ⁷ : E01F 15/08, 13/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) E01F 13/00, 15/08, 15/10		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT + keywords FLUID or LIQUID or WATER or HOLLOW, BARRIER or BEAM or RAIL		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 531 540 A (WASSERSTROM et al) 2 July 1996 Drawing figures; col 6 line 51 - col 11 line 47	1 - 7 8, 9
X	US 5 387 049 A (DUCKETT) 7 February 1995 Whole document	1 - 7
X	FR 2 589 176 A (ETABLISSEMENTS GAILLARD-RONDINO) 30 April 1987 Whole document	1, 4 - 7
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex		
<p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&" document member of the same patent family</p>		
Date of the actual completion of the international search 20 October 2000		Date of mailing of the international search report 31 OCT 2000
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer VENKAT IYER Telephone No : (02) 6283 2144

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00950

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	Derwent Abstracts Accession No.97-348140/32, Class Q41, JP 09143944 A (KRE ENGINEERS KK) 3 June 1997 Abstract	1, 2, 4 - 7
X Y	EP 0 485 746 A (SPS SCHUTZPLANKEN GmbH) 20 May 1992 Whole document	10, 11 8, 9
X Y	FR 2 749 329 A (PLATTARD SA SOCIETE ANONYME) 5 December 1997 Whole document	10, 11 8, 9

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00950

Box I Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos :
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos :
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos :
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)

Box II Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

PLEASE SEE EXTRA SHEET

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/AU00/00950

Supplemental Box

(To be used when the space in any of Boxes I to VIII is not sufficient)

Continuation of Box No: II

The international application does not comply with the requirements of unity of invention because it does not relate to one invention or to a group of inventions so linked as to form a single general inventive concept. In coming to this conclusion the International Searching Authority has found that there are different inventions as follows:

1. Claim 1. It is considered that *a barrier system comprising a plurality of barrier elements wherein each of said plurality of barrier elements is maintained substantially in abutment with adjacent barrier elements such that the side walls of at least one side of the plurality of barrier elements form a longitudinally extending obstacle and having a longitudinally extending guard mounted thereon and wherein the longitudinally extending guard overlies two or more of the barrier elements* comprises a first "special technical feature".
2. Claim 10. It is considered that *the plurality of barrier elements include a foundation wherein said foundation is integral with the plurality of barrier elements or engaged with the plurality of barrier elements and which foundation is anchored to the surface on which the barrier system is to be deployed* comprises a second "special technical feature".

Since the abovementioned independent claims do not share any of the technical features identified, a "technical relationship" between the inventions, as defined in PCT rule 13.2 does not exist. Accordingly the international application does not relate to one invention or to a single inventive concept, a priori.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/AU00/00950

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member	
US	5531540	NONE		
US	5387049	NONE		
JP	9143944	NONE		
FR	2589176	NONE		
EP	485746	DE	4032731	
FR	2749329	NONE		
END OF ANNEX				